

# VEGETABLE CROPS

## CORNELL COOPERATIVE EXTENSION

### Common Rust of Sweet Corn

by Helene R. Dillard and Thomas A. Zitter

Departments of Plant Pathology  
New York State Agricultural  
Experiment Station, Geneva  
and Cornell University

Common rust of sweet corn is caused by the fungus *Puccinia sorghi*. Epidemics of this disease can cause serious losses in yield and quality of sweet corn. High rust susceptibility of many popular sweet corn hybrids is a major factor contributing to rust epidemics. Another factor is that sweet corn is usually planted over an extended period from May through June for fresh and processing uses. The staggered planting schedules result in high concentrations of fungal spores in the air, originating from early planted fields, at the time when late-planted fields contain young actively growing susceptible plants.

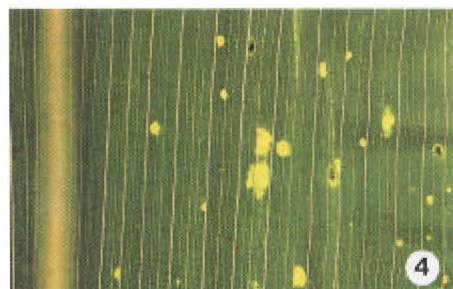
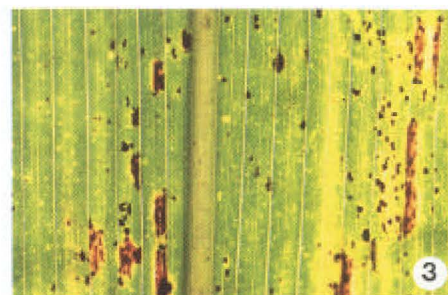
#### Symptoms and Signs

Common rust on sweet corn appears in the field as oval to elongate cinnamon brown pustules scattered over upper and lower surfaces of the leaves (fig. 1). The pustules rupture and expose dusty red spores (urediniospores, fig. 2), which are spread by wind and have the ability to infect other corn leaves directly. As the pustules mature, they turn brownish black and release the dark-brown overwintering spores (teliospores). In severe epidemics, pustules may also appear on the ears and tassels, and the leaves may yellow and become easily tattered in strong winds. Partial resistance is expressed as chlorotic or necrotic hypersensitive flecks with little or no sporulation (compare fig. 3, susceptible, and fig. 4, resistant).

#### Disease Cycle

The complete life cycle of *P. sorghi* includes five different spore types and two hosts, corn (c) and species of wood sorrel (*Oxalis* spp.) (o, fig. 5). The spore types and the hosts they infect are teliospores (o), basidiospores (o), pycniospores (o), aeciospores (c), and urediniospores (c). All spore types occur in Mexico, but those involving the alternate host, *Oxalis* spp., are of little importance in the life cycle of the fungus as it occurs in temperate areas of the United States. The aecial stage (fig. 6, called "cluster-cups") appears on the underneath surface of *Oxalis* leaves, producing aeciospores, which are windborne and infect corn leaves. These infections give rise to urediniospores, which are the most-important spore type in the northern United States. Urediniospores occur on corn leaves throughout the growing season and continue cyclic infections. The disease cycle for common rust is illustrated in figure 7.

Severe rust epidemics on dent corn have been rare because of the availability of resistant varieties. However, rust epidemics on sweet corn have been severe, though somewhat sporadic. Three major factors interact to influence the outbreak of rust epidemics on sweet corn: (1) the quantity of urediniospores available to initiate rust epidemics, (2) environmental factors, and (3) the level of rust susceptibility in the sweet corn varieties in use. Urediniospores are unable to overwinter successfully in northern climates. Each spring urediniospores move north from the southwestern United States and Mexico, following the sequential plantings of corn from the south up to Canada. Temperatures of 60° to 75° F (16–24° C) and heavy dews or high relative humidity (close to 100%) favor rust development. The current weather conditions influence spore germination and the rate at which rust epidemics develop. Moisture is required for spore germination. Infection will occur when leaves are wet for a minimum of 3 to 6 hours.



## Control

**Cultural.** Although most of the current popular sweet corn hybrids are susceptible to rust, resistant varieties are becoming available. Two types of resistance are being used by commercial sweet corn breeders: race-specific resistance and partial rust resistance. A partial list of hybrid reaction to rust severity at harvest, from most to least resistant, includes aRRestor, Excellency, and Prevailer (possess specific resistance with 0% rust severity and fungus unable to sporulate); Sweetie, Miracle, Country Gentleman, Sucro, Sugar Time (partial resistance); Dandy, Gold Dust, Golden Glade, Patriot, Tendertreat EH, Sugar Loaf (moderate resistance); Seneca Horizon, Gold Cup, Seneca Sentry, Kandy Corn EH, Jubilee, Sweet Sal, Commander, Stylepak, Merit, Silver Queen, Florida Staysweet, and Sweet Sue (least resistance). Resistant or moderately resistant varieties should be used for late plantings when fungal spore density in the air is likely to be high as a result of infections of earlier-planted sweet corn. The varieties listed are examples only, and no endorsement is implied. For suggestions on varieties adapted to New York growing conditions, see *Cornell Recommendations for Commercial Vegetable Production*.

**Fungicides.** Modest control of rust on sweet corn can be achieved with applications of fungicides. Trials conducted in western New York have shown that three applications of mancozeb applied by air significantly reduced disease severity on all the leaves of sweet corn plants. Fungicide applications also significantly increased the number of harvestable ears and the weight of the harvested ears. Secondary ears tended to be more severely affected by rust than primary ears. Research conducted in other states has shown that, by controlling rust with fungicides, improvements in moisture content,

sugar content, and ear-tip fill were observed. Timing of the first fungicide application is critical because it needs to be applied early enough to reduce the rate of epidemic development. Because rust spores arrive from outside the immediate area planted to corn, it is difficult to predict when this spray should be applied. From research conducted in western New York, a 6-pustule-per-leaf action threshold has been proposed for initiation of fungicide sprays on later plantings of susceptible sweet corn. This threshold is only a guideline and is still in the process of being validated.

Refer to the most recent issue of *Cornell Vegetable Recommends* for registered products for use on sweet corn and follow label directions.

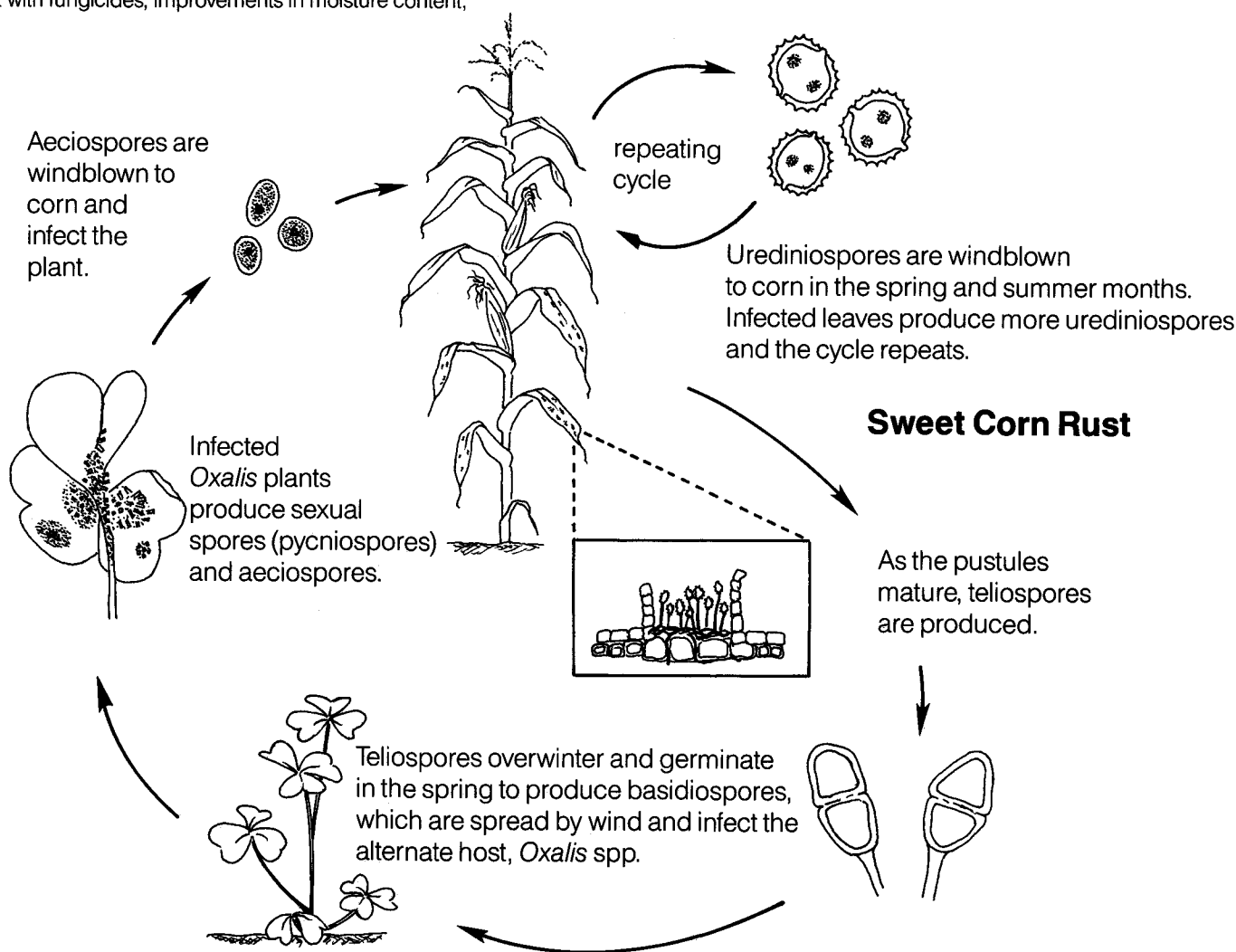
## Acknowledgments

Appreciation is extended to the Cornell Integrated Pest Management Program for partial funding, to Kent Loeffler and Joe Ogradnick for photographic assistance, and to Rose McMillen-Sticht for illustrating the disease cycle.

A Cornell Cooperative Extension fact sheet, published in cooperation with the College of Agriculture and Life Sciences at Cornell University. 1987.

This publication is issued to further Cooperative Extension work mandated by acts of Congress of May 8 and June 30, 1914. It was produced with the cooperation of the U.S. Department of Agriculture and Cornell Cooperative Extension, College of Agriculture and Life Sciences, College of Human Ecology, and College of Veterinary Medicine, at Cornell University. Cornell Cooperative Extension provides equal program and employment opportunities. Lucinda A. Noble, Director.

45/70 12/87 4M CP 871522



**Figure 7. Disease cycle of sweet corn rust caused by the fungus *Puccinia sorghi*.**